# CONTENT

# COURSE INFORMATION LETTER

| University: P. J. Šafárik University in Košice | |
|---|---|
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ TZLD/15 | **Course name:** Algorithmically unsolvable problems |

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
 To understand basic notions of algorithmically unsolvable problems, mutual reduction of problems and the grades of unsolvability.

**Brief outline of the course:**
 Variants of halting problems and their algorithmical unsolvability.
 Undecidability of the theory of natural numbers, Goedel's a Tarski's theorem.
 Relationship between undecidability and completeness.
 Algorithmical unsolvability of some mathematical problems.
 Diofantesian equations and non-existence of an algorithm for existence of their solutions.
 Mutual reduction of problems and the grades of unsolvability.

**Recommended literature:**
 1. BARWISE, J. ed.: Handbook of mathematical logic, North Holland, 1977.
 2. KLEENE, S. C.: Introduction to metamathematics, Van Nostrand, 1952.
 3. MENDELSON, E.: Introduction to mathematical logic, Van Nostrand, 1963.
 4. DAVIS, M.: Hilbert's tenth problem is unsolvable, Amer. Math. Monthly, 1973, pp.233-296.

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 1

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Stanislav Krajči, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ SALD/15 | **Course name:** Algorithms on strings |
|---|---|

**Course type, scope and the method:**
  **Course type:** Lecture / Practice
  **Recommended course-load (hours):**
  **Per week:** 2 / 0 **Per study period:** 28 / 0
  **Course method:** present

**Number of ECTS credits:** 8

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 7

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ CZC/15 | **Course name:** Citation in international scientific journal |
|---|---|

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|---|
| **Course type, scope and the method:**<br> **Course type:**<br> **Recommended course-load (hours):**<br> **Per week: Per study period:**<br> **Course method:** present |
| **Number of ECTS credits:** 10 |
| **Recommended semester/trimester of the course:** |
| **Course level:** III. |
| **Prerequisities:** |
| **Conditions for course completion:** |
| **Learning outcomes:** |
| **Brief outline of the course:** |
| **Recommended literature:** |
| **Course language:** |
| **Notes:** |

**Course assessment**
 Total number of assessed students: 11

| abs | n |
|---|---|
| 100.0 | 0.0 |

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|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ CDC/15 | **Course name:** Citation in local scientific journal |
|---|---|

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 0

| abs | n |
|---|---|
| 0.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ CM/15 | **Course name:** Citation in monograph |
|---|---|

**Course type, scope and the method:**
 **Course type:**
 **Recommended course-load (hours):**
 **Per week:  Per study period:**
 **Course method:** present

**Number of ECTS credits:** 20

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 0

| abs | n |
|---|---|
| 0.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| University: P. J. Šafárik University in Košice | |
|---|---|
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ SDPR/15 | **Course name:** Co-worker of a local project |
| **Course type, scope and the method:** <br> **Course type:** <br> **Recommended course-load (hours):** <br> **Per week:  Per study period:** <br> **Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 65

| abs | n |
|---|---|
| 100.0 | 0.0 |

| **Provides:** |
|---|
| **Date of last modification:** 03.05.2015 |
| **Approved:** |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ SMPR/15 | **Course name:** Co-worker of an international project |
|---|---|

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|---|
| **Course type, scope and the method:**<br>  **Course type:**<br>  **Recommended course-load (hours):**<br>  **Per week:  Per study period:**<br>  **Course method:** present |
| **Number of ECTS credits:** 15 |
| **Recommended semester/trimester of the course:** |
| **Course level:** III. |
| **Prerequisities:** |
| **Conditions for course completion:** |
| **Learning outcomes:** |
| **Brief outline of the course:** |
| **Recommended literature:** |
| **Course language:** |
| **Notes:** |

| **Course assessment**<br> Total number of assessed students: 12 | |
|---|---|
| abs | n |
| 100.0 | 0.0 |

| |
|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** |

# COURSE INFORMATION LETTER

| University: P. J. Šafárik University in Košice |
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| Faculty: Faculty of Science |
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| Course ID: ÚINF/ VYMD/15 | Course name: Computational complexity and models |
|---|---|

| Course type, scope and the method:<br> Course type: Lecture<br> Recommended course-load (hours):<br> Per week: 2 Per study period: 28<br> Course method: present |
|---|

| Number of ECTS credits: 9 |
|---|

| Recommended semester/trimester of the course: |
|---|

| Course level: III. |
|---|

| Prerequisities: |
|---|

| Conditions for course completion:<br> Written test combined with an oral examination. |
|---|

| Learning outcomes:<br> Providing en extended backgroung in the area of efficient computations, computational complexity of algorithms, and fundamental time and space complexity classes, hardest complete problems, and about reducibility among problems. |
|---|

| Brief outline of the course:<br> Basic computational models; relations among different models with respect to their computational complexity; deterministic and nondeterministic computations; basic complexity classes - L, NL, P, NP, PSPACE, NPSPACE; reducibilities of problems; complete languages in basic complexity classes; hierarchy and translation theorems for time and space; relativization; alternating computations and hierarchies. |
|---|

| Recommended literature:<br> J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2007.<br> M. Sipser: Introduction to the Theory of Computation, Thomson, 2nd edition, 2006.<br> S. Arora, B. Barak: Computational Complexity: A Modern Approach, Cambridge Univ. Pess, 2009.<br> C. Calude and J. Hromkovič: Complexity: A Language-Theoretic Point of View, in G. Rozenberg and A. Salomaa, Handbook of Formal Languages II, Springer, 1997.<br> G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996.<br> Ch. H. Papadimitriou: Computational Complexity, Addison-Wesley, 1994.<br> D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994. |
|---|

| Course language: |
|---|

| Notes: |
|---|

| Course assessment | |
|---|---|
| Total number of assessed students: 27 | |
| N | P |
| 0.0 | 100.0 |
| **Provides:** prof. RNDr. Viliam Geffert, DrSc. | |
| **Date of last modification:** 02.07.2021 | |
| **Approved:** | |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ PGOD/15 | **Course name:** Computer graphics and image processing |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture / Practice
 **Recommended course-load (hours):**
 **Per week:** 2 / 1 **Per study period:** 28 / 14
 **Course method:** present

**Number of ECTS credits:** 8

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
To introduce the basic elements of the visual system, internal and external representations of an image, the image pre-processing methods and applications for surface visual inspection.

**Brief outline of the course:**
Introduction to computer vision. Collecting and storing images. Capturing and digitizing. Representation of the image - the image space. Color models. Multispectral images. Properties of digital images. Local operations. Global operations. Active contours. Segmentation. Texture, variety of symptoms. 3D reconstruction and visualization. Chaos and fractals.

**Recommended literature:**
1. ŠONKA, P., HLAVÁČ, V., BOYLE: Image processing, Analysis and Machine Vision, 2nd edition, International Thomson Publishing Inc., 1999.
2. TURCEZAN, M., JAIN, A.K.: Texture analysis. The handbook of pattern recognition and computer vision. World Scientific Pub. Co., 1998.

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 9

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Csaba Török, CSc., doc. RNDr. Jozef Jirásek, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ KRYD/15 | **Course name:** Cryptology |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
 Witten and oral exam.

**Learning outcomes:**
 To learn theoretical background and standard methods of computer algebra and know how they can be used in cryptographic systems and cryptoanalytic methods. To know current trends of research in this area of computer science.

**Brief outline of the course:**
 Special parts of computational algebra - rings of polynoms, cyclic groups, factorization of big numbers, arithmetic of eliptic curves. Actual problems of symmetric and nonsymmetric cryptography and cryptoanalysis.

**Recommended literature:**
 1. ROSEN, K. H.: Elementary Number Theory and Its Applications, Addison Wesley, 2000
 2. STINSON, D. R. : Cryptography. Theory and Practie, CRC Press, 2002
 3. MEZENES, A.,. van Oorschot, P., Vanstone, S.: Handbook of Applied Cryptography, CRC Press, 1996
 4. BLAKE, I. F., Seroussi, G., Smart, N.P.: Elliptic Curves in Cryptography, CUP 1999

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 6

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Gabriel Semanišin, PhD., doc. RNDr. Jozef Jirásek, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

| **Faculty:** Faculty of Science |
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| **Course ID:** ÚINF/ SDSD/15 | **Course name:** Data and signal processing |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 8

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
 Mastering the basics of data and signal processing methods and appropriate software.

**Brief outline of the course:**
 The list of both applications based on advanced data and signal processing methods and the areas of their leveraging is continuously rising. The subject acquaints the students with the most significant methods for solution of tasks in signal processing and the appropriate software. It helps the students to understand random phenomena in science and technology and clarify the differences in data model types.

**Recommended literature:**
 [1] Steven T. Karris, Signals and Systems with MATLAB, Orchard Publications, 2008
 [2] Zarchan P., Fundamentals of Kalman Filtering, A Practical Approach, AIAA, 2005
 [3] Mohinder S.G., Kalman filtering, Theory and Practice Using MATLAB, John Wiley & Sons, 2008
 [4] CONGDON P., Bayesian Statistical Modelling, John Wiley & Sons, 2006
 [5] Albert J., Bayesian Computation with R, Springer, 2009

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 8

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Csaba Török, CSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

**Faculty:** Faculty of Science

| **Course ID:** ÚINF/ SIZD/15 | **Course name:** Data processing and information profit |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
Overview of stochastic and numerical methods of processing data and signals, their modeling and obtaining information from them.

**Brief outline of the course:**
States, representation of dependencies and statistical models. Search schema and dependencies in data, classification of objects, parametric and nonparametric methods, smoothing data, piecewise approximation, splines, multivariate methods. Discriminant, cluster, factor, Fourier and wavelet analysis. Entropy and information function.

**Recommended literature:**
- E.Alpaydin: Introduction To Machine Learning, MIT Press, 2004
- S.Mallat, A Wavelet Tour of Signal Processing, Academic Press, 1999
- J.Anděl: Matematická statistika, SNTL 1985

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 1

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. RNDr. Csaba Török, CSc.

**Date of last modification:** 03.05.2015

**Approved:**

## COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ ODZP/15 | **Course name:** Defence of diploma thesis |
|---|---|

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 30

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 15

| N | P |
|---|---|
| 6.67 | 93.33 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ PPC/15 | **Course name:** Direct pedagogical activities |
|---|---|

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 3

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 184

| abs | n |
|---|---|
| 98.91 | 1.09 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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| **Faculty:** Faculty of Science |

| **Course ID:** ÚINF/ DZS/15 | **Course name:** Dissertation examination |
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| **Course type, scope and the method:** <br> **Course type:** <br> **Recommended course-load (hours):** <br> **Per week: Per study period:** <br> **Course method:** present |

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| **Number of ECTS credits:** 20 |

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| **Recommended semester/trimester of the course:** |

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| **Course level:** III. |

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| **Prerequisities:** |

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| **Conditions for course completion:** |

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| **Learning outcomes:** |

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| **Brief outline of the course:** |

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| **Recommended literature:** |

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| **Course language:** |

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| **Notes:** |

**Course assessment**
Total number of assessed students: 33

| N | P |
|---|---|
| 0.0 | 100.0 |

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| **Provides:** |

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| **Date of last modification:** |

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| **Approved:** |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** CJP/ AJD1/07 | **Course name:** English Language for PhD Students 1 |
|---|---|

**Course type, scope and the method:**
  **Course type:** Practice
  **Recommended course-load (hours):**
  **Per week:** 2 **Per study period:** 28
  **Course method:** present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:** 1.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
  Written assignments - professional CV, short academic biography (200-350 words).
  distance mode of instruction using MS teams

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
  Total number of assessed students: 654

| N | Ne | P | Pr | abs | neabs |
|---|---|---|---|---|---|
| 0.0 | 0.0 | 51.38 | 0.0 | 48.62 | 0.0 |

**Provides:** PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.

**Date of last modification:** 11.02.2021

**Approved:**

# COURSE INFORMATION LETTER

| University: P. J. Šafárik University in Košice |
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| Faculty: Faculty of Science |
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| Course ID: CJP/ AJD2/07 | Course name: English Language for PhD Students 2 |
|---|---|

**Course type, scope and the method:**
 Course type: Practice
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 Course method: present

**Number of ECTS credits:** 3

**Recommended semester/trimester of the course:** 2.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
 Distance mode of instruction. Online consultations.
 Test, oral exam in accordance with the exam requirements (https://www.upjs.sk/filozoficka-fakulta/cjp/doktorandi-upjs/)

**Learning outcomes:**
 Development of students´language skills, improvement of students´linguistic competencies (selected aspects of English pronunciation, vocabulary and syntax), development of students´s pragmatic competence (selected aspects of functional grammar) with focus on English for academic and specific purposes. B2/C1 level of lanugage competence (according to CEFR.)

**Brief outline of the course:**
 Specific aspecs of academic and professional English with focus on vocabulary development (noun and verb collocations, phrasal verbs, prepositional phrases, word-formation, formal/informal language, etc.), selected aspects of English grammar (prepositions, grammar tenses, passive voice, etc.), selected functional grammar (expressing opinion, cause/effect, arguments, examples, etc.). Academic communication. Cross-language interference.

**Recommended literature:**
 Kolaříková, Z., Petruňová, H., Timková, R.: Angličtina v akademickom prostredí (cvičebnica). UPJŠ Košice, 2015
 McCarthy, M., O´Dell, F.: Academic Vocabulary in Use. CUP, 2008
 Štepánek, L., J. De Haff a kol.: Academic English-Akademická angličtina. Grada Publishing, a.s., 2011
 Blašková, K.: Handbook of English for Postgraduate Students. Vyd. SPRINT Bratislava, 2007
 Dušková, L. a kol.: Hovorová angličtina pre vedeckých a odborných pracovníkov. Veda. Bratislava, 1982
 Armer, T.: Cambridge English for Scientists. CUP, 2011
 Porter, D.: Check your vocabulary for Academic English. Macmillan Publishers Limited, 2008
 Oxford Collocations Dictionary for students of English. OUP, 2002
 lms.upjs.sk

**Course language:**

B2/C1 level according to CEFR

**Notes:**

**Course assessment**
Total number of assessed students: 649

| N | Ne | P | Pr | abs | neabs |
|---|---|---|---|---|---|
| 0.31 | 0.0 | 93.07 | 1.23 | 5.39 | 0.0 |

**Provides:** PhDr. Helena Petruňová, CSc., Mgr. Zuzana Kolaříková, PhD.

**Date of last modification:** 10.02.2021

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ FKAD/15 | **Course name:** Formal concept analysis |
|---|---|

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| **Course type, scope and the method:** <br>   **Course type:** Lecture / Practice <br>   **Recommended course-load (hours):** <br>   **Per week:** 2 / 0 **Per study period:** 28 / 0 <br>   **Course method:** present |
| **Number of ECTS credits:** 8 |
| **Recommended semester/trimester of the course:** |
| **Course level:** III. |
| **Prerequisities:** |
| **Conditions for course completion:** |
| **Learning outcomes:** |
| **Brief outline of the course:** |
| **Recommended literature:** |
| **Course language:** |
| **Notes:** |
| **Course assessment** <br>  Total number of assessed students: 0 |

| N | P |
|---|---|
| 0.0 | 0.0 |

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|---|
| **Provides:** prof. RNDr. Stanislav Krajči, PhD. |
| **Date of last modification:** 03.05.2015 |
| **Approved:** |

| University: P. J. Šafárik University in Košice |
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| Faculty: Faculty of Science |
|---|

| Course ID: ÚINF/ AFJD/15 | Course name: Formal languages and finite-state automata |
|---|---|

**Course type, scope and the method:**
 Course type: Lecture
 Recommended course-load (hours):
 Per week: 2 Per study period: 28
 Course method: present

| Number of ECTS credits: 9 |
|---|

| Recommended semester/trimester of the course: |
|---|

| Course level: III. |
|---|

| Prerequisities: |
|---|

**Conditions for course completion:**
 Written test combined with an oral examinationi.

**Learning outcomes:**
To obtain an overview in the efficient representation of regular languages and finite state automata, as well as about connection between automata and complexity theory.

**Brief outline of the course:**
Chomsky hierachy of languages and grammars. Finite state automata and its variants: deterministic, nondeterministic, alternating, probabilistic, quantum ... one-way, two-way, reversal bounded. Regular expressions and grammars. Unary regular languages and their properties. Connection between finite state automata and complexity theory. Pushdown automata, time and space complexity for recognition of context-free languages. Closure properties of contex-free, context-sensitive, and recursively enumerable languages.

**Recommended literature:**
Current journal publications on the topic, especially those related to the descriptional complexity of automata.
J.E. Hopcroft, R.Motwani, J.D. Ullman: Introduction to automata theory, languages, and computation, Addison-Wesley, 2001.
J. Shallit: A second course in formal languages and automata theory, Cambridge University press, 2009.
M. Sipser: Introduction to the theory of computation, Thomson Course Technology, 2006.
D.P.Bovet, P.Crescenzi: Introduction to the theory of complexity, Prentice Hall, 1994.
J.van Leeuwen (ed.): Handbook of theoretical science, North-Holland, 1990.
G.Brassard, P.Bradley: Fundamentals of algorithmics, Prentice Hall, 1996.

| Course language: |
|---|

| Notes: |
|---|

| Course assessment<br>Total number of assessed students: 14 | |
|---|---|
| N | P |
| 0.0 | 100.0 |
| **Provides:** prof. RNDr. Viliam Geffert, DrSc. | |
| **Date of last modification:** 02.07.2021 | |
| **Approved:** | |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ NEM/15 | **Course name:** Installing of new experimental methods |
|---|---|

**Course type, scope and the method:**
  Course type:
  Recommended course-load (hours):
  Per week:  Per study period:
  Course method: present

**Number of ECTS credits:** 15

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 3

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ MK/15 | **Course name:** International conference |
|---|---|

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| **Course type, scope and the method:**<br>　**Course type:**<br>　**Recommended course-load (hours):**<br>　**Per week:  Per study period:**<br>　**Course method:** present |

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| **Number of ECTS credits:** 6 |

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| **Recommended semester/trimester of the course:** |

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| **Course level:** III. |

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| **Prerequisities:** |

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| **Conditions for course completion:** |

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| **Learning outcomes:** |

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| **Brief outline of the course:** |

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| **Recommended literature:** |

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| **Course language:** |

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| **Notes:** |

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| **Course assessment**<br>　Total number of assessed students: 74 |

| abs | n |
|---|---|
| 97.3 | 2.7 |

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|---|
| **Provides:** |

| |
|---|
| **Date of last modification:** 03.05.2015 |

| |
|---|
| **Approved:** |

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ ZKC/15 | **Course name:** International currented journal |
|---|---|

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 20

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 21

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ ZNC/15 | **Course name:** International non-currented journal |
|---|---|

**Course type, scope and the method:**
 Course type:
 Recommended course-load (hours):
 Per week:  Per study period:
 Course method: present

**Number of ECTS credits:** 8

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 12

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ NZ/15 | **Course name:** International or local not-reviewed proceedings |
|---|---|

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 4

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 20

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ DK/15 | **Course name:** Local conference |
| **Course type, scope and the method:** <br>  **Course type:** <br>  **Recommended course-load (hours):** <br>  **Per week: Per study period:** <br>  **Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |
| **Course assessment** <br>  Total number of assessed students: 28 | |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| | |
|---|---|
| **Provides:** | |
| **Date of last modification:** 03.05.2015 | |
| **Approved:** | |

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ DKZU/15 | **Course name:** Local conference with international participation |
| **Course type, scope and the method:** <br> **Course type:** <br> **Recommended course-load (hours):** <br> **Per week: Per study period:** <br> **Course method:** present | |
| **Number of ECTS credits:** 4 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 44

| abs | n |
|---|---|
| 100.0 | 0.0 |

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|---|
| **Provides:** |
| **Date of last modification:** 03.05.2015 |
| **Approved:** |

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ DKC/15 | **Course name:** Local currented journal |
|---|---|

**Course type, scope and the method:**
  Course type:
  Recommended course-load (hours):
  Per week:  Per study period:
  Course method: present

**Number of ECTS credits:** 15

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 1

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ DNC/15 | **Course name:** Local non-currented journal |
|---|---|

**Course type, scope and the method:**
 **Course type:**
 **Recommended course-load (hours):**
 **Per week: Per study period:**
 **Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 4

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

**Faculty:** Faculty of Science

| **Course ID:** ÚINF/ LOGD/15 | **Course name:** Logic |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
To understand basic notions of predicate logic (logic language, term, formula, axioms, proof, provability, truth, model, syntax and semantics, soundness, completeness) and to check student's ability to formalize concisely.

**Brief outline of the course:**
Predicate logic – logic language, syntax and semantics, term, formula.
Axioms, proof, provability.
Interpretation, truth, model.
Correctness of the predicate logic.
Boolean algebras.
Syntactic model, completeness of predicate logic.
Inductive structures in general.
Aplications of logic in database systems.

**Recommended literature:**
1. GOLDSTERN, M., JUDAH H.: The Incompleteness Phenomenon, A New Course in Mathematical Logic, A K Peters, Wellesley, Massachusetts, 1995
2. ABITEBOUL, S. HULL, R., VIANU, V.: Foundations of databases, Addison-Wesley Publishing Co, 1995

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 11

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Stanislav Krajči, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ POVK/15 | **Course name:** Membership in a conference organizing committee |
|---|---|

**Course type, scope and the method:**
  Course type:
  Recommended course-load (hours):
  Per week:  Per study period:
  Course method: present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 21

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ MBPD/15 | **Course name:** Modelling and analysis of security protocols |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
 Written and oral exam.

**Learning outcomes:**
 To learn essential properties of the used cryptographic authentication and certification schemes and standard methods of attacks to them. To understand the theoretical background of a design of formal models and know how it is possible to utilise them in practise. To know the actual problems concerning the analysis of the security of cryptographic protocols.

**Brief outline of the course:**
 Authentication and certification schemes, key distribution and maintenance. Formal description of cryptographic protocols and methods for their analysis. Algebraic and logic methods for attack modelling, utilisation of dynamic logical systems. Datalog for automatic security verification.

**Recommended literature:**
 1. RYAN, P. Y. A., SCHNEIDER, S.A.: Modelling and Analysis of Security Protocols, Addison Wesley, 2001
 2. HUTH, M., RYAN, M.: Logic in Computer Science - Modelling and Reasoning about Systems, CUP, 1999
 3. MENEZES, A., van OORSCHOT, P., VANSTONE, S.: Handbook of Applied Cryptography, CRC Press, 1996

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 4

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Gabriel Semanišin, PhD., doc. RNDr. Jozef Jirásek, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ MNID/15 | **Course name:** Models of imperfect information |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
 To give the students basic techniques in systems processing imperfect information to be able read and write scientific papers in the area.

**Brief outline of the course:**
 Belief and probability, Dempster-Shaferova belief. Necessity and possibility. Uncertainty in artificial intelligence.
 Fuzzy sets, constructions of fuzzy sets from statistic data.
 Uncertainty in artificial intelligence, Markov and Bayesian networks, belief updating, belief revision.

**Recommended literature:**
 1. PEARL J.: Probabilistic Reasoning in Intelligent Systems: Networks of Plausible Inference, Morgan – Kaufmann, San Francisco, CA, 1988
 2. JENSEN, F. V.: An Introduction to Bayesian networks, UCL Press, 1996
 3. DUBOIS, D., Prade, H.: Possibility Theory. Plenum Press, N.York, 1988
 4. PARIS, J. B.: The uncertain Reasoners Companion. Cambridge University Press, 1994

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 2

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Stanislav Krajči, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ NEK1/15 | **Course name:** Neurocognition |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture / Practice
 **Recommended course-load (hours):**
 **Per week:** 2 / 2 **Per study period:** 28 / 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
 Midterm exam. Project
 Final exam consisting of written and/or oral part.

**Learning outcomes:**
 Skills in quantitative analysis and modeling of neural data. Overview of cognitive functions and their neural basis in the human brain.

**Brief outline of the course:**

**Recommended literature:**
 1. Poeppel D., Mangun G., Gazzaniga M. (ed.): The Cognitive Neurosciences. 6th ed. MIT Press. 2020. ISBN-13: 978-0262043250
 2. Dayan P and LF Abbott: Theoretical Neuroscience - Computational and Mathematical Modeling of Neural Systems. MIT Press, 2005 ISBN-13: 978-0262541855
 3. Thagard P: Mind: Introduction to Cognitive Science, 2nd Edition. Bradford Books. ISBN-13 : 978-0262701099
 4. KANDEL, E. R., SCHWARTZ, J. H. and JESSELL, T.M.: Principles of Neural Science. McGraw-Hill, 2021 ISBN-13: 978-1259642234
 5. HERTZ, J., KROGH, A. and PALMER R. G.: Introduction to the theory of neural computation. Addison-Wesley 1991 ISBN-13: 978-0201515602

**Course language:**
 English

**Notes:**

**Course assessment**
 Total number of assessed students: 3

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** doc. Ing. Norbert Kopčo, PhD.

**Date of last modification:** 08.07.2021

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

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|---|---|
| **Course ID:** ÚINF/ IG/15 | **Course name:** Obtaining of internal grant |

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 10

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 34

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ PVS/15 | **Course name:** Patents, inventions, and software |
|---|---|

**Course type, scope and the method:**
  Course type:
  Recommended course-load (hours):
  Per week:  Per study period:
  Course method: present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 11

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ VYS/15 | **Course name:** Presentation of results in a seminar |
|---|---|

**Course type, scope and the method:**
  Course type:
  Recommended course-load (hours):
  Per week:  Per study period:
  Course method: present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 78

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ PAHD/15 | **Course name:** Probabilistic and approximate algorithms |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture / Practice
 **Recommended course-load (hours):**
 **Per week:** 2 / 1 **Per study period:** 28 / 14
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
 Written test combined with an oral examination.

**Learning outcomes:**
 Providing en extended backgroung in the area of probabilistic and approximation algorithms, with respect to their classification, efficiency, and probability of error.

**Brief outline of the course:**
 Basic probabilistic computational models, Las Vegas algorithms, Monte Carlo algorithms. Probabilistic classes with polynomial time. Foiling the adversary, Hashing, Fingerprinting.

**Recommended literature:**
 1. HROMKOVIČ, J.: Design and analysis of ranodmized algorithms. Springer-Verlag, 2005. ISBN 3-540-23949-9.
 2. MOTWANI, R. and RAGHAVAN, P.: Randomized Algorithms. Cambridge University Press 1995. ISBN 0-521-47465-5
 3. MITZEMANCHER, M. and UPFAL, E.: Probability and Computing: Randomized Algorithms and Probabilistic Analysis. Cambridge University Press 2005. ISBN 0-521-83540 2
 4. HROMKOVIČ, J.: Communication Protocols - An Exemplary Study of the Power of Randomness. In: Handbook on Randomized Computing, P.Pardalos, S.Rajasekaran, J.Reif, J.Rolim, Eds., Kluwer Publ., 2001.

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 10

| N | P |
|---|---|
| 0.0 | 100.0 |

**Provides:** prof. RNDr. Viliam Geffert, DrSc., prof. RNDr. Gabriel Semanišin, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ KVAD/15 | **Course name:** Quantum algorithms |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture / Practice
 **Recommended course-load (hours):**
 **Per week:** 2 / 0 **Per study period:** 28 / 0
 **Course method:** present

**Number of ECTS credits:** 8

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
 oral exam

**Learning outcomes:**
To learn how quantum algorithms can be used for solving hard problems, in coding theory and in cryptology.

**Brief outline of the course:**
Quantum information. Principles and power of quantum computing. Fast factorisation. Qunatum search algorithm anf ther application for NP-hard problems. The class BQNP - an analogy of the class NP. Quantum coding. Quantum kryptography.

**Recommended literature:**
1. GRUSKA, J. Quantum Computing. McGraw-Hill, 1999.
2. HIRVENSALO, M. Quantum Computing, Springer, 2004.
3. KITAEV, A.Y., SHEN, A.H., VYVALYI, M.N. Classical and Quantum Computation. American Mathematical Society, 2002.
4. NIELSEN, M.A., CHUANG, I.L. Quantum Computation and Quantum Information. Cambridge University Press, 2000.
5. STEEB, W. H., HARDY, Y. Problems And Solutions in Quantum Computing And Quantum Information. World Scientific Publishing Company, 2006.

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 0

| N | P |
|---|---|
| 0.0 | 0.0 |

**Provides:** prof. RNDr. Gabriel Semanišin, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ VPBP/15 | **Course name:** Review of a bachelor thesis |
| **Course type, scope and the method:** <br> **Course type:** <br> **Recommended course-load (hours):** <br> **Per week: Per study period:** <br> **Course method:** present | |
| **Number of ECTS credits:** 2 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 49

| abs | n |
|---|---|
| 100.0 | 0.0 |

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|---|---|
| **Provides:** | |
| **Date of last modification:** 03.05.2015 | |
| **Approved:** | |

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|
| **Faculty:** Faculty of Science |

| **Course ID:** ÚINF/ RZ/15 | **Course name:** Rewieved international or local proceedings |
|---|---|

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| **Course type, scope and the method:**<br> **Course type:**<br> **Recommended course-load (hours):**<br> **Per week: Per study period:**<br> **Course method:** present |

| |
|---|
| **Number of ECTS credits:** 10 |

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| **Recommended semester/trimester of the course:** |

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|---|
| **Course level:** III. |

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| **Prerequisities:** |

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| **Conditions for course completion:** |

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| **Learning outcomes:** |

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| **Brief outline of the course:** |

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| **Recommended literature:** |

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| **Course language:** |

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| **Notes:** |

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| **Course assessment**<br> Total number of assessed students: 95 |

| abs | n |
|---|---|
| 100.0 | 0.0 |

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|---|
| **Provides:** |

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| **Date of last modification:** 03.05.2015 |

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|---|
| **Approved:** |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ SCI/15 | **Course name:** SCI citation |
| **Course type, scope and the method:** <br>  **Course type:** <br>  **Recommended course-load (hours):** <br>  **Per week: Per study period:** <br>  **Course method:** present | |
| **Number of ECTS credits:** 20 | |
| **Recommended semester/trimester of the course:** | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 5

| abs | n |
|---|---|
| 100.0 | 0.0 |

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|---|---|
| **Provides:** | |
| **Date of last modification:** 03.05.2015 | |
| **Approved:** | |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ SOS1a/15 | **Course name:** Special branch seminar |
|---|---|

**Course type, scope and the method:**
 **Course type:** Practice
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 1.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**
Cieľom predmetu je usmernenie študenta k samostatnému a tvorivému získavaniu najnovších poznatkov orientovaných na problematiku príbuznú téme dizertačnej práce, a takisto priebežné overovanie jeho schopností novozískané poznatky prezentovať.

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 39

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|
| **Faculty:** Faculty of Science |

| **Course ID:** ÚINF/ SOS1b/15 | **Course name:** Special branch seminar |
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| **Course type, scope and the method:**<br>  **Course type:** Practice<br>  **Recommended course-load (hours):**<br>  **Per week:** 2 **Per study period:** 28<br>  **Course method:** present |

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| **Number of ECTS credits:** 5 |

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| **Recommended semester/trimester of the course:** 2. |

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| **Course level:** III. |

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| **Prerequisities:** |

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| **Conditions for course completion:** |

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| **Learning outcomes:** |

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| **Brief outline of the course:** |

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| **Recommended literature:** |

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| **Course language:** |

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| **Notes:** |

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| **Course assessment**<br> Total number of assessed students: 37 |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc. |

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| **Date of last modification:** 03.05.2015 |

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|---|
| **Approved:** |

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ SOS2a/15 | **Course name:** Special branch seminar |
| **Course type, scope and the method:** <br> **Course type:** Practice <br> **Recommended course-load (hours):** <br> **Per week:** 2 **Per study period:** 28 <br> **Course method:** present | |
| **Number of ECTS credits:** 5 | |
| **Recommended semester/trimester of the course:** 3. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 33

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ SOS2b/15 | **Course name:** Special branch seminar |
|---|---|

**Course type, scope and the method:**
 **Course type:** Practice
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 4.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 32

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|
| **Faculty:** Faculty of Science |

| **Course ID:** ÚINF/ SOS3a/15 | **Course name:** Special branch seminar |
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| **Course type, scope and the method:** |
|   **Course type:** Practice |
|   **Recommended course-load (hours):** |
|   **Per week:** 2 **Per study period:** 28 |
|   **Course method:** present |

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| **Number of ECTS credits:** 5 |

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| **Recommended semester/trimester of the course:** 5. |

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| **Course level:** III. |

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| **Prerequisities:** |

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| **Conditions for course completion:** |

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| **Learning outcomes:** |

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| **Brief outline of the course:** |

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| **Recommended literature:** |

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| **Course language:** |

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| **Notes:** |

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| **Course assessment** |
|  Total number of assessed students: 32 |

| abs | n |
|---|---|
| 100.0 | 0.0 |

| |
|---|
| **Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc. |

| |
|---|
| **Date of last modification:** 03.05.2015 |

| |
|---|
| **Approved:** |

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ SOS3b/15 | **Course name:** Special branch seminar |
|---|---|

**Course type, scope and the method:**
 **Course type:** Practice
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 5

**Recommended semester/trimester of the course:** 6.

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 33

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ SOS4a/15 | **Course name:** Special branch seminar |
| **Course type, scope and the method:**<br> **Course type:** Practice<br> **Recommended course-load (hours):**<br> **Per week:** 2 **Per study period:** 28<br> **Course method:** present | |
| **Number of ECTS credits:** 5 | |
| **Recommended semester/trimester of the course:** 7. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
 Total number of assessed students: 22

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ SOS4b/15 | **Course name:** Special branch seminar |
| **Course type, scope and the method:**<br> **Course type:** Practice<br> **Recommended course-load (hours):**<br> **Per week:** 2 **Per study period:** 28<br> **Course method:** present | |
| **Number of ECTS credits:** 5 | |
| **Recommended semester/trimester of the course:** 8. | |
| **Course level:** III. | |
| **Prerequisities:** | |
| **Conditions for course completion:** | |
| **Learning outcomes:** | |
| **Brief outline of the course:** | |
| **Recommended literature:** | |
| **Course language:** | |
| **Notes:** | |

**Course assessment**
Total number of assessed students: 22

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Gabriela Andrejková, CSc., prof. RNDr. Viliam Geffert, DrSc.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** Dek. PF UPJŠ/JSD/14 | **Course name:** Spring School for PhD Students |
|---|---|

**Course type, scope and the method:**
  **Course type:** Lecture
  **Recommended course-load (hours):**
  **Per week: Per study period:** 4d
  **Course method:** present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 154

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:** doc. RNDr. Marián Kireš, PhD.

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |
| **Course ID:** ÚINF/ ZSP/15 | **Course name:** Studies at foreign universities |

**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 2

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 20

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

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|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ VPSV/15 | **Course name:** Supervision of a students scientific work |
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**Course type, scope and the method:**
  **Course type:**
  **Recommended course-load (hours):**
  **Per week:  Per study period:**
  **Course method:** present

**Number of ECTS credits:** 6

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 21

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

**Faculty:** Faculty of Science

| **Course ID:** ÚINF/ VBP/15 | **Course name:** Supervision of bachelor thesis |
|---|---|

**Course type, scope and the method:**
 **Course type:**
 **Recommended course-load (hours):**
 **Per week: Per study period:**
 **Course method:** present

**Number of ECTS credits:** 6

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**

**Learning outcomes:**

**Brief outline of the course:**

**Recommended literature:**

**Course language:**

**Notes:**

**Course assessment**
 Total number of assessed students: 53

| abs | n |
|---|---|
| 100.0 | 0.0 |

**Provides:**

**Date of last modification:** 03.05.2015

**Approved:**

# COURSE INFORMATION LETTER

| | |
|---|---|
| **University:** P. J. Šafárik University in Košice | |

| | |
|---|---|
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ TNSD/15 | **Course name:** Theoretical aspects of neural networks |
|---|---|

**Course type, scope and the method:**
 **Course type:** Lecture
 **Recommended course-load (hours):**
 **Per week:** 2 **Per study period:** 28
 **Course method:** present

**Number of ECTS credits:** 9

**Recommended semester/trimester of the course:**

**Course level:** III.

**Prerequisities:**

**Conditions for course completion:**
Evaluation of individual work in the study of theoretical issues of neural networks. Oral examination.

**Learning outcomes:**
To understand mathematical principles of neural networks and to know their capabilities. To be able to construct models of neural networks to solve some problems.

**Brief outline of the course:**
1.-3. Computational complexity of neural networks.
4.-6. Probabilistic neural networks.
7.-9. Computational capability of neural networks, a transformation of neural networks to Turing machines, and Turing machines to neural networks.
10.-12. Approximation of functions using neural networks.
13. Kolmogorov theorem and its proof, theorems connected to Kolmogorov theorem.

**Recommended literature:**
1. GOODFELLOW Ian, BENGIO Yoshua a Aaron COURVILLE. Deep Learning. MIT Press, 2016. ISBN: 9780262035613.
2. HERTZ, John, Anders KROGH a Richard G. PALMER. Introduction to the theory of neural computation. Redwood City: CRC Press, [1991]. Santa Fe Institute studies in the sciences of complexity. ISBN 0-201-51560-1.
3. KVASNIČKA, Vladimír. Úvod do teórie neurónových sietí. [Slovenská republika]: IRIS, 1997. ISBN 80-88778-30-1.
4. ŠÍMA, Jiří a Roman NERUDA. Teoretické otázky neuronových sítí. Praha: MATFYZPRESS, 1996. ISBN 80-85863-18-9.
5. HASSOUN, M. H.: Fundamentals of artificial neural networks, The MIT Press, 1995.
6. HAYKIN, S.: Neural Networks, A comprehensive foundation, Prentice-Hall, second edition 1999.

**Course language:**
Slovak or English

**Notes:**

| Course assessment<br>Total number of assessed students: 24 | |
|---|---|
| N | P |
| 0.0 | 100.0 |
| **Provides:** doc. RNDr. Gabriela Andrejková, CSc. | |
| **Date of last modification:** 26.08.2021 | |
| **Approved:** | |

# COURSE INFORMATION LETTER

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|---|---|
| **University:** P. J. Šafárik University in Košice | |
| **Faculty:** Faculty of Science | |

| **Course ID:** ÚINF/ PDS/18 | **Course name:** Writing Dissertation Thesis |
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| **Course type, scope and the method:** <br>  **Course type:** <br>  **Recommended course-load (hours):** <br>  **Per week: Per study period:** <br>  **Course method:** present |
| **Number of ECTS credits:** 0 |
| **Recommended semester/trimester of the course:** |
| **Course level:** III. |
| **Prerequisities:** |
| **Conditions for course completion:** |
| **Learning outcomes:** |
| **Brief outline of the course:** |
| **Recommended literature:** |
| **Course language:** |
| **Notes:** |
| **Course assessment** <br>  Total number of assessed students: 2 |

| N | P |
|---|---|
| 0.0 | 100.0 |

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| **Provides:** |
| **Date of last modification:** 20.02.2020 |
| **Approved:** |